



# Decision Making Constructs in a Distributed Environment (DCODE)

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# Agenda

- Background
  - Problem
  - Objectives
  - Approach
- Discussion of Proposed Experiment
  - Concepts, models, tools & demo
- Group Feedback

# DCODE: Background/Problem

- Many military decision making environments consist of:
  - Distributed participants (time/place)
  - Participants that have both shared (public) and uniquely held decision-relevant information
- Research (Stasser et al) indicates that uniquely held information is often not exchanged between the participants (emphasis is on the public information)
- Result is that decisions are based on missing and partial information.
  - Particularly serious in “hidden profile” situations.

# DCODE Objectives

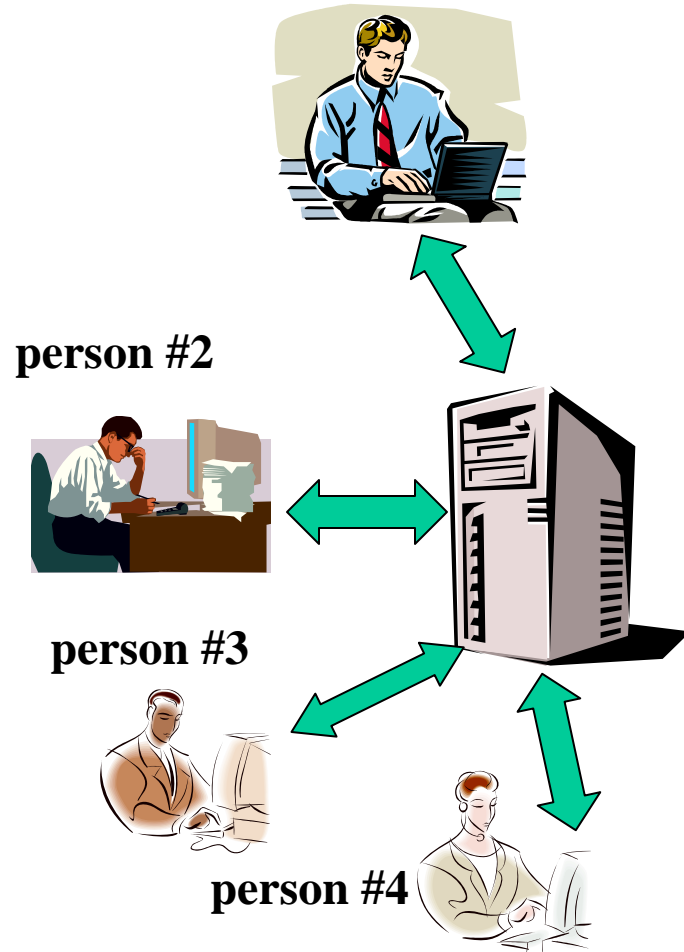
- Stasser's work is based on traditional face-to-face meeting situations.
  - Determine if the results are the **same for decision making in a time/place asynchronous collaborative environment?**
- In a computer-based, on-line distributive decision making task, **develop procedures and technologies that enhance the exchange of decision-relevant uniquely held information.**
- Have group decision makers reach “Collective Intelligence”, i.e. **all relevant, uniquely held information is moved into the shared, public domain.**

# DCODE Approach

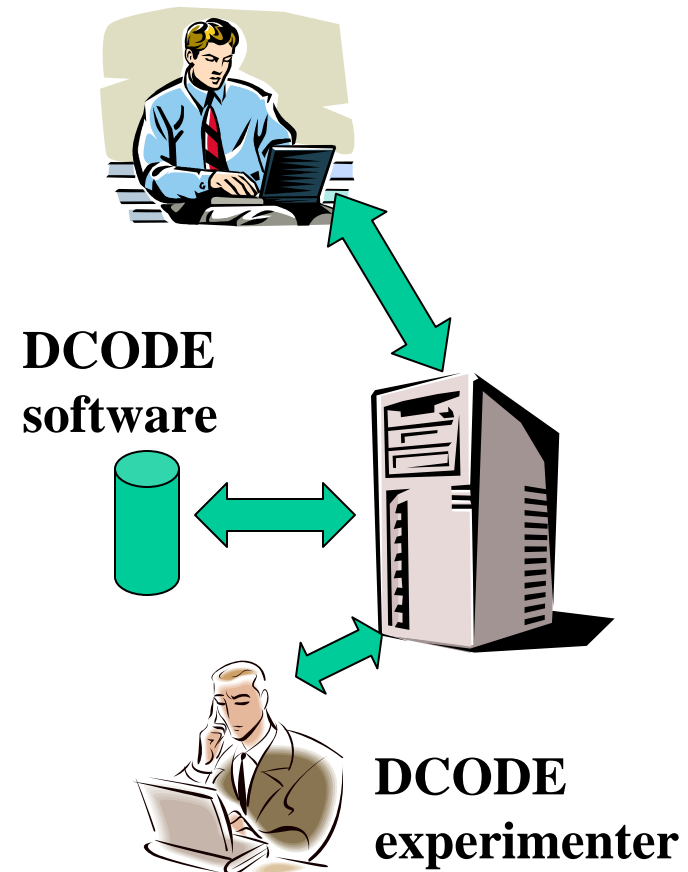
1. Develop simplified on-line knowledge elicitation (KE) techniques that tap a participant's
  - **Categorization of an information item**
    - What decision factor does it relate to?
  - **Assessment of the effect of the item**
    - Positive, negative or neutral influence on taking a COA?
  - **Importance/Relevance of the item**
    - High, medium or low importance to decision?
2. Develop GUI for group input of KE results such that each participant can easily
  - **Detect significant areas of disagreement**
  - Select appropriate relevant unique items of information to exchange (transmit/receive) with other participants to **reconcile differences and reach Collective Intelligence**

# Experimental Design

## Subject's perception



## Reality



# Experimental Design

- Subjects
  - Experiment will be **web-based** and use 20+ participants taken from SSC SD or University setting.
- Scenario/Stimulus Materials
  - You are part of a “new business” planning staff for a medium-sized US manufacturing company. You, and three other members of the staff have been asked to examine the **advisability of establishing a new manufacturing plant in the country of Islandia.**
  - Receives information on 5 evaluation parameters (**some items shared, some unique**)
    - Labor Pool
    - Salary/Benefits
    - Political Stability
    - Infrastructure
    - Red Tape/Incentives
  - Use information items to **assess Yes/No aspect of each parameter** (7 point scale)
  - How would you **reconcile differences between yourself and the other analysts?**



# Experimental Sequence

## **Subject reviews information**

- Instruction set provides task instructions
- Receives 5 Common or shared information items
- Receives 15 uniquely-held information items  
(5 positive, 5 negative, 5 irrelevant)

## **Completes scoring of The parameters**

- From review of shared & uniquely-held information, participant makes judgment of each of the 5 constructs

## **Transmits judgment to group, sees group judgment**

- After judgment on each parameter, sends decision input to others

## **Reviews group inputs**

- Participant reviews group feedback

## **Selects prioritized queries to be sent**

- Who?
- What Construct?
- Share which item?

# What the S gets:

- 5 items of information listed as SHARED items
  - 1 for each construct
  - 1 is Neutral, 2 are Minus, 2 are Positive
- Followed by 15 more items listed as UNIQUE items:
  - 5 are irrelevant
  - Remaining 10 are divided as:
    - 2 for each construct
    - Could be Minus/Minus, Positive/Positive, Minus/Positive
- There are 3 items related to each construct (total 15)
- There are 5 irrelevant, filler items

# Sequence of inputs:

		First (shared)	Two Unique Items	
Change:	M	Minus	Positive	Minus
Sup	P	Minus	Positive	Positive
Rev	P	Positive	Positive	Minus
Sup	M	Positive	Minus	Minus
Rev	N	Neutral	Positive	Minus
None				

# Research Questions:

- Does the **change** in shared to unique information content influence the direction/priority of information exchange?
  - e.g. are the MPP or PMM triads shared more often than PMP or MPM ?
- Does the **degree of difference** between participants scores influence the direction/priority of information exchange?
  - e.g. do larger score discrepancies get more attention?
  - Is the size of the discrepancy most important or is its relationship to the score of the shared item that most influences information exchange?

## Research Questions (cont.):

- Do people select the correct (most relevant) information items to share?
- Does the **sequence** of arriving information influence judgment?
  - e.g. are the triads MPP and PMP scored the same?
- Is one GUI better than another for display of group judgment information

# Research Questions (cont.):

- Do people exhibit internal consistency?
  - e.g. does overall ranking track with scores on individual parameters?
- Can people ignore irrelevant items?
- Do Neutral items get a neutral score?
- Is this modified Repertory Grid a viable KE design?
- Can people complete this type of a task in a reasonable amount of time?

# Discussion/Comments